IMPERIAL
DEPARTMENT OF AGRICULTURE
FOR THE WEST INDIES.

REPORT

ON THE

AGRICULTURAL DEPARTMENT, ST. LUCIA.

1913-14.

BARBADOS:
ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE
FOR THE WEST INDIES.

1914.

[Price Sixpence.]

REPORTS

ON THE

BOTANIC STATION, ECONOMIC PLOTS AND AGRICULTURAL EDUCATION, ST. LUCIA.

Annual Reports on Certain Economic Experiments conducted in connexion with the Botanic Station, 1900-2.

Annual Reports on the Botanic Station for the years 1901 and 1902.

Annual Reports on the Botanic Station, Economic Experiments and Agricultural Education for the years 1902-13.

SUGAR-CANE EXPERIMENTS.

IN BARBADOS.

Report of the Agricultural Work for 1900 :—
Manurial Experiments and Experiments with Varieties of Sugar-cane.

Report of the Agricultural Work for the seasons 1899-1901 to 1908-10.
Parts I and II ; Manurial Experiments. Part III ; Varieties of Sugar-cane.

IN THE LEEWARD ISLANDS.

Report on Experiments conducted with Sugar-canes in the season 1899-1900.

Reports on Experiments conducted with Sugar-canes in the seasons 1900-1 to 1909-10.

Part I ; Varieties of Sugar-cane. Part II ; Manurial Experiments.

Sugar-cane Experiments in the Leeward Islands, 1911-12 and 1912-13.

Parts I and II published together in Royal 8vo.

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LETTER OF TRANSMITTAL.

Commissioner of Agriculture—to His Honour the Administrator, St. Lucia.

Barbados,
No. Lu. 2613. September 18, 1914.

Sir,

I have the honour to forward the Report on the Agricultural Department, St. Lucia for the year ended March 31, 1914.

2. In issuing this Report certain improvements in the form have been introduced, namely, general headings immediately under the number of each page, and a table of contents on the first page. This should facilitate reference considerably.

3. Perusal of the publication will show it to contain a large amount of important information, of which that dealing with the Réunion Experiment Station and the Government Lime Juice Factory calls for special attention. Both these new institutions have successfully passed through their first year's operations with results that give cause for much gratification.

4. Progress in the chief industries will be seen to have been satisfactory. The value of the lime products exported was approximately £3,110 compared with £1,084 and £290, the values for 1912-13 and 1911-12 respectively. The value of the sugar products exported also shows an increase being £67,679 compared with £53,549 for 1911-12.

5. Efforts connected with agricultural education appear, on the whole, to be serving a useful purpose. Improvement is indicated in regard to nature study in the elementary schools.

6. Official notices relating to Réunion are reprinted in this Report in the form of an appendix, and will no doubt be found useful for reference.

7. In conclusion I have to express my appreciation of the work done by the Agricultural Officers. Especially commendable has been the energy and ability displayed in overcoming the initial difficulties in regard to the establishment of the new institutions referred to in paragraph 3.

I have etc.,

(Sgd.) FRANCIS WATTS,

Commissioner of Agriculture
for the West Indies.

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REPORT ON THE AGRICULTURAL DEPARTMENT, ST. LUCIA.

For the Year Ended March 31, 1914.

Work in the Gardens and Observations on Plants.

The routine work necessary to maintain the plant collection, grounds and nursery of the Botanic Station in good condition has received the usual attention, and progress has been made with the work of extending the lawns and the general improvements of the grounds on the lines previously reported on.

Extensive walk repairs have been undertaken, 2,135 linear feet having been put in good order. The supply of material and labour was not sufficient to complete the work but it is hoped that it may be possible to finish the walks and to construct the proposed subsoil lawn drains during the coming year.

Progress has been made with the excavations for the proposed small water garden, the soil removed being used in raising the adjoining land, and this has since been planted in lawn grass. The work will be further advanced as labour can be spared.

A small plot of Government land adjoining the garden on the northern boundary has been enclosed with a fence, to include it in the Station grounds as a compost depôt; a cart road, 50 feet long, has been constructed to give the necessary access. The former unsightly depôt in the centre of the grounds has been reduced, and an ornamental hedge of Panax and Acalypha is now well established and screens the part that has to be retained for burning garden rubbish; the use of a fire in the new depôt being objectionable to adjacent householders. Considerable improvement will result when the alterations have been completed.

The new lawns laid down during the previous year are now well established and greatly enhance the general attractiveness of the grounds. These stretches of grass permit greater freedom of movement about the Station—an advantage which is much appreciated by visitors and especially the children, who as a rule regard the restrictions of paths and borders with a naive contempt.

The new crimson-purple flowered Bougainvillea referred to in the last report has been successfully propagated and flowering plants have been sent to Government House grounds and to the Commissioner of Agriculture. Plants have also been planted out in the Botanic and Experiment Station grounds and a stock of plants is now being raised for sale locally.

Ixora Macrothyrsa with its immense trusses of crimson red flowers is one of the most magnificent flowering shrubs in the Gardens, but has always proved more difficult to propagate by cuttings or layers than our other species. Repeated trials with cuttings have shown that the best results are obtained by using moderately young side shoots covered with a bell glass, but they are very slow in rooting, and require about a year to reach a planting size. A batch of these plants for planting out in the Garden is now on hand.

The Garden seats were repaired and painted.

PLANT IMPORTATIONS.

In the Annual Report of this Department for 1911-12, reference was made to the discovery of *Juniperus barbadensis* growing near the top of the Petite Piton.

With the object of establishing a small trial plot of this species, seeds have been obtained through the Commissioner of Agriculture, and a small batch of young plants has been raised. These will be grown in the nursery to a size suitable for planting out.

A few plants of *Juniperus bermudiana* and *Juniperus pachyphloea* have also been raised. The latter species is known as the Alligator Juniper. Plants of grafted mangoes of the varieties Amini, Bombay Special, and Stalkart, were received from the Trinidad Agricultural Department, and planted out at the Experiment Station.

Work in the Nurseries and Distribution of Plants.

PLANTS DISTRIBUTED.

Plants.	Sale and exchange.	Free to Crown Land purchasers.	Total.
Limes	54,937	1,800	56,737
Cacao	416	550	966
Oranges (budded)	197		197
Mangoes (budded and grafted) ...	30		30
Rubber, Para	75		75
Nutmegs	59	106	165
Bananas	72		72
Decorative	247		247
Various economic	93		93
Cuttings, decorative and economic ...	100		100
Totals	56,226	2,456	58,682

There were also distributed 616 packets of seeds, chiefly of proved varieties of garden vegetables.

Quantities of horse beans (*Canavalia ensiformis*) have again been distributed free to estates where it was desired to introduce them for trial.

Plants and seeds have been distributed in exchange to the Botanical Departments of Trinidad, Dominica, Antigua, St. Kitts, Tobago, New Delhi; also to the Commissioner of Agriculture, the Colonial Secretary of Jamaica, and Mr. A. S. Duff, Castries. Free plants have been sent to Government House, and the Victoria Hospital. Plants of *Aleurites Fordii* were sent to the Hon. G. S. Hudson for trial. The plants distributed free to Crown Land purchasers are indicated in the foregoing return.

Forty contributions of plants and seeds were received and dealt with; those which grew successfully and are new to our collection are referred to under the heading 'New Plants'.

The temporary set-back in the lime nurseries as reported last year did not cause the serious delay in the distribution of lime plants that was at first anticipated. Nearly 8,000 plants were sent out in July, and 19,000 in August. By the end of November close upon 54,000 had been supplied to planters.

It is estimated that several thousands of plants have also been raised in estate nurseries.

Very satisfactory progress in lime planting is indicated; the number of plants sent out from the Departments' nurseries reached the total of 56,737.

The Agricultural Superintendent has been instructed to assume charge of the creation and subsequent upkeep of the ornamental part of the New Government Office Grounds.

Work has been commenced, soil having been carted and spread in readiness for the formation of lawns and ornamental beds. Some lawn grass has been planted, and further planting operations will be continued when more favourable rainy weather sets in. The labour for transporting and spreading the soil was provided by the Prison Department.

Mr. L. Mallet Paret kindly gave permission for the soil to be obtained from the stone quarry that was being worked by the Prison Department.

The Department's work at Union has been gradually closed down during the year and lime nurseries and plots of economic plants have been laid out and planted at the new Station on the Réunion estate. The very considerable amount of extra work involved in carrying out this transfer of operations has been successfully got through. A brief statement with regard to a few of the more important economic plants is appended.

NOTES ON ECONOMIC PLANTS.

MULBERRY (*Morus Alba*). The plants set out at Union are now in their second year. When about 5 feet high the terminal buds of the branches on some of the trees were removed and this has caused them to branch more freely. The best of the topped trees are now 12-13 feet high and have a head spread of 4-6 feet. The best of the untopped trees range from 8-15 feet in height with a head spread of only 2 feet.

SPINELESS LIMES (Section 4 Union). Planted in October 1910 at 15 feet apart the best of these trees have now reached a height of 14 feet and in some instances the longer branches of adjacent trees are touching. This indicates that they might, with advantage, have been planted wider apart, say 20 feet, under the prevailing conditions of soil and rainfall.

PARA RUBBER (Section 8 Union). Twelve plants put out in May 1911 now average 17¼ feet in height having made growth averaging 7′ 6″ during the year. Nineteen plants put out in July 1912 now have an average height of 12 feet, which gives an increase of 6′ 3″ for the year. The best tree of the 1911 batch has a stem girth of 11½ inches at 2 feet from the ground, while that of the best 1912 batch measures 9 inches.

EUCALYPTUS SP. (Section 9 Union). Planted as a wind-break in June 1912, these trees have, on the whole, made good progress. The twelve best range in height from 15 feet to 20 feet, having during the year made growth ranging from 7 to 9 feet. The stem girth of the best tree, at 2 feet from the ground is 7 inches.

EUCALYPTUS (Botanic Station). The *Eucalyptus patentinervis* planted out in August 1912 near the Northern boundary have grown fairly well. Five trees

now range in height from 5¾ to 11 feet, the least amount of growth has been made where the soil is most swampy. A tree of *E. Citriodora* planted on land a few inches higher than that of the best *E. patentinervis* is now 13¾ feet high Several unsuccessful attempts have been made in St. Lucia to establish Eucalyptus on swampy land. The plants invariably fail entirely or drag out a lingering existence for a time. On land that is free from stagnant water there appears to be no difficulty in establishing them. Several species flourish in St. Lucia and make rapid growth under favourable soil conditions. The possibility of utilizing the Eucalypti for fuel production on lime estates was dealt with in the previous report.

The work at the Réunion Station, which is now well in hand, is dealt with in the following report by Mr. A. J. Brooks the Assistant Agricultural Superintendent and Officer-in-Charge :

Reunion Experiment Station.

General Description.

Brief mention was made in the last Annual Report of the Government's decision to remove the Experiment Station and Plant Nurseries from Union to the 'Réunion' estate at Choiseul. This transference of the Station from the northern end of the island to a little beyond the centre of the Leeward coast places it in a more central position and in closer touch with the general agricultural activities of the island.

This arrangement also made it possible for the Assistant Agricultural Superintendent, who now resides at Réunion, to undertake the duties of Officer-in-Charge of the Réunion estate and Land Officer in connexion with Land Settlement.

About 60 acres of land belonging to the Government and forming part of a large plateau overlooking the sea and village of Choiseul was selected and set aside for the use of the Agricultural Department.

Soil.

The soil throughout this area is of a light friable loam, easily worked, and of an average depth of 3 to 4 feet. The subsoil being composed of very soft rock crumbles readily upon exposure, and no difficulty is therefore experienced in deepening the soil at any given point.

Like most soils along the Leeward coast, it is however deficient in humus, and as large quantities of stable manure cannot be obtained, this organic matter will have to be supplied by the continuous cropping of green dressings. If this is carried out judiciously, each year should see a great improvement in the texture of the soil.

Situation and Rainfall.

The land being situated some 200 feet above sea-level is in consequence greatly exposed to prevailing winds, and much attention will have to be given to the question of suitable wind-belts

The rainfall from the date of assuming charge of the estate (March 4) to December 31, was 65·73 inches. From general observations and deduction it is expected that the average annual fall will prove to be between 70 and 75 inches; this, although a little on the dry side is quite adequate for general agricultural purposes, *provided special attention is given to the methods adopted in arid localities for conserving soil moisture.*

A daily supply of water is however essential for successful nursery work, and to supply this it is proposed to pump water from the Choiseul River to a storage tank situated above the nurseries, and obtain the delivery to the nurseries by means of natural gravitation. This work is being undertaken by the Public Works Department.

It was expected that this water service would have been available by the end of December before the dry season set in; there is but little chance now, however, of its being ready before the annual rains commence in June.

Plant Nurseries.

About 10 acres of land has been divided from the remainder by a bamboo wind-belt and a row of open water trenches 300 feet long and 4 feet deep. These trenches serve as catch pits for soil during the rainy season and as water reservoirs during the dry season, in addition to preventing the bamboo from encroaching upon the nursery beds.

This section of land has been laid out in rows of nursery beds, 100 feet long and 5 feet wide, each series of beds being divided by a grass-mown road 12 feet wide. These beds are now well stocked with seedling limes, oranges and mangoes intended for general distribution in June and succeeding months.

Permanent Plots.

Twelve quarter-acre plots have been laid out immediately above the nurseries for the cultivation of permanent or orchard crops. Each plot being divided by grass-mown roads on all four sides allows free access to every plant in these plots.

Limes.

Sowing commenced in July and continued at intervals until September. Transplanting commenced in September and continued until stopped by the dry weather in December. The seedlings grew well and no trouble was experienced from scale pests. Spraying with Bordeaux mixture was however frequently necessary during the rainy months when the seedlings were a few weeks old to check the damping off fungus.

The dry season commenced earlier than usual, only ·36 inch of rain falling between December 14 and January 22. This dry spell occurred at the most critical stage of the nursery work. At this period the nurseries contained 75,000 newly transplanted lime seedlings intended for distribution in 1914, in addition to 150,000 seedling limes and 2,000 orange and mango stocks. By maintaining a dust mulch over the surface of the beds no serious loss occurred, and there is now every reason to believe that the plants will withstand the dry season even in the absence of the water service, and be ready for general distribution in June.

Although great anxiety was experienced during this period, it proved very conclusively that the soil at Réunion is capable of withstanding a drought of considerable severity.

Lime plants raised under such conditions must be hardier and in a better condition to withstand exposure when distributed throughout the island than are plants grown under more favourable conditions.

NOTES ON PLOTS AT THE EXPERIMENT STATION, RÉUNION.

MANGO PLOTS. Two of the quarter-acre plots previously mentioned have been planted up with well-known varieties of mangoes.

Attempts were made to remove many of the large stock plants from Union but owing to the necessity of removing nearly the whole of the soil from their roots to prevent the introduction of Johnson grass to the new station little success resulted; most of the plants died within a few weeks of their removal.

The following varieties, from which it is hoped to obtain future material for budding and grafting, have been planted out:—

Reine; Amelia; Julie; Mulgoba; Divine; Malda; Peach; D'Or; Imperial; Peters; Pere Louis; Stalkart; Bombay Special; No. 11; Ennurrua; and Martin.

ORANGE PLOT. This plot has been planted with the following varieties: Homassa; Ruby; Washington Navel; Whittaker; Tardiff; Magrala; Pine-apple and Union Sweet.

In addition to this plot two rows of orange plants have been set out running from East to West throughout the length of the nurseries; this collection contains Lamb's Summer and St. Michael Blood in addition to the above mentioned varieties.

All these plants are making good progress.

PARA RUBBER. A small plot has been planted up with stumps removed from the old station. They have commenced to branch and are making fair progress.

GRAPE-FRUIT. The stock plants were removed from Union and planted out but they failed to recover from the transplanting. Budwood was obtained previous to their removal and plants are being raised to replace them.

LIME PLOTS. Two quarter-acre plots have been planted up with spineless and the ordinary lime for experimental purposes.

EUCALYPTUS. Special attention is being paid to establishing a collection of Eucalypti to ascertain their suitability for supplying cord wood, and to test various species as wind-belts. For the latter purpose a row running from North to South along the estate road was planted up with these trees in September. The plants, which were quite small at the time of planting, were set out 8 feet apart in the row; several of them have grown 8 feet in eight months.

The collection contains the following species: *E. patentinervis; E. saligna; E. citriodora; E. paniculata; E. globulus; E. ficifolia; E. resinifera* and a few undetermined species.

VANILLA. About ½-acre of land has been cleared of bush and planted with stumps of *Gliricidia maculata* for the purpose of establishing a permanent plot of vanilla with the object of distributing cuttings later to the Land Settlement holders to enable them to plant up their boundaries, where suitable, with this crop.

GREEN DRESSING CROPS. Plots of horse bean (*Canavalia ensiformis*), *Crotalaria striata*; *C. juncea* and *Tephrosia candida* have been established, from which seed will be raised for general distribution.

ECONOMIC PLANT COLLECTION.

A good start has been made in getting together a collection of economic plants and flowering trees. It is hoped that these efforts will be steadily continued year by year until this Station can boast of a collection at least equal to those of the neighbouring islands.

The following plants have been set out during the year under review: *Tabebuia pentaphylla*; *Hernandia sonora*; *Bauhinia variegata*; *B. tomentosa*; *Erythrina crista-galli* (the Coral tree); *E. Velutina*; *E. umbrosa*; *E. indica*; *Cassia floribunda*; *C. grandis*; *Callistemon lanceolatus*; *Pterocarpus Rohii*; *Eugenia jambolana*; *Acacia catechu*; *Erythroxylon coca*; *Mimusops elongi*; *Blighia sapida*; *Cyphomandra betacea*; *Combretum laxum*; *Solandra grandiflora*; *Fragraea zylancia*; *Aleurites Fordii* (China wood oil); *A. triloba*.

Three plants of *Wormia Burbigei*, a flowering tree native of Borneo, were received from the Curator of the Botanic Gardens, Dominica. This tree produces an abundance of pale yellow flowers nearly all the year round, so should prove of decorative value to the island. Seeds of *Cassia nodosa*, another fine flowering tree, were also received from the same officer.

DECORATIVE WORK.

As the new Station adjoins the densely populated village of Choiseul, a certain amount of attention has been given to the laying out of a few ornamental flower beds and borders to render the Station, as a whole, more attractive. This effort has been appreciated by the public who now make the Station their chief Sunday rendezvous.

OFFICIAL VISITS TO THE STATION.

His Honour E. J. Cameron, C.M.G. (late Administrator), visited the Station in March, May and December. The Imperial Commissioner of Agriculture (Dr. Francis Watts, C.M.G.) made two visits in May and November. Mr. W. Nowell, Mycologist on the Staff of the Imperial Department of Agriculture, visited in January.

Work Connected with Insect and Fungus Pests and their Control.

An insect which has been identified as the Fulgorid bug, *Ormenis* sp., occurred in large numbers on a species of Jasminum in the Botanic Station. The bugs were found to be freely parasitized by a fungus which was identified as a species of Isaria, of which the fructifications were found in abundance on the dead insects occurring in large numbers on the shrub at the time of observation. Many of the dead bugs were also covered with a green fungus of the order Tuberculariaceæ which is reported to be probably saprophytic. This bug has also been observed on lime trees but there is at present no evidence of its doing any harm.

In connexion with efforts to distribute the useful entomogenous fungi, supplies of the white-headed fungus (*Ophionectria coccicola*) and the red-headed fungus (*Shœrostilbe coccophila*) have been collected and sent to St. Vincent and Barbados. Material has also been distributed locally. The abundant occurrence, in St Lucia, of fungi which serve to keep scale insects in check was referred to in the Mycologist's report after his tour of inspection, and it is a matter for congratulation that the natural control thus effected is so efficient.

The degree of control, however, is very considerably affected by environmental conditions, and it is of great importance that lime growers should make all reasonable effort to establish and maintain suitable conditions for encouraging the activity of these fungi, and not trust entirely to unaided nature to remedy the defects of environment, or the mistakes of agricultural practice. The need for wind breaks in lime plantations is referred to elsewhere.

A report on the prevalence of insect and fungoid pests of cultivated crops during 1913 has been sent to the Commissioner of Agriculture.

Specimens of large greyish weevils with an orange band on the margin of the elytra and found feeding on lime leaves, were sent for examination. The Entomologist reported them to belong to the genus Diaprepes. The scarcity of these insects has hitherto prevented fuller investigation, and indicates that at present they need cause no anxiety to lime growers.

An unknown green-coloured fungus was observed covering scale insects on lime trees at Union. Specimens were submitted for examination as it was thought it might prove to be another useful scale insect parasite. It was reported as

belonging to the sub-family Cephalosporiæ of the Mucedinaceæ. No evidence of possible facultative parasitism was observed, and in this case the fungus was growing as a saprophyte on scale insects whose death could be otherwise accounted for.

The progress of the Cacao Root Disease Experiments is reported by Mr. A. J. Brooks, Assistant Agricultural Superintendent, as follows :—

INVESTIGATIONS IN CONNEXION WITH CACAO ROOT DISEASE.

In 1912 a number of field experiments were laid out in the Soufrière district for the purpose of elucidating some important points which were not cleared up during the investigation of the Rosellinia root disease of cacao by the Mycologist on the Staff of the Imperial Department of Agriculture, and the Assistant Agricultural Superintendent who furnishes the following notes :—

These experiments have progressed during the year and several of the points upon which information was desired have been satisfactorily elucidated.

Experiment 1 has proved conclusively that the fungus can live on large pieces of cut branches such as are commonly found throughout cacao fields after pruning the shade trees, etc.

Unfortunately, experiment 2 has also demonstrated the fact that lime trees planted in an infected area are liable to be attacked by the disease.

Experiment 3 was to test the curative powers of a fungicide known as 'Fungal'. An application of this substance was applied to the soil around three slightly infected trees. One tree has since died and the remaining two show no signs of recovering.

The object of experiment 4 was to ascertain the effect of 'Fungal' in checking the spread of the disease. The results obtained were disappointing. The disease continued to spread across the treated area, completely killing out the cacao trees in its path until stopped by the isolation trench.

These experiment plots were visited during the year by Mr. W. Nowell, who succeeded Mr. South as Mycologist on the Staff of the Imperial Department of Agriculture. His report dealing with this work is as follows :—

Continued experience with this disease confirms the knowledge that the only practical way known at present to deal with this disease is to surround the infected area with a deep isolation trench, thoroughly liming the infected soil and burning the diseased wood on the spot.

Progress in the Chief Industries.

SUGAR.

The quantity of Usine sugar exported during 1913 shows some increase, while that of muscovado sugar and molasses shows some falling off; this is indicated in

YOUNG ORANGE TREE FRUITING WITHIN 12 MONTHS OF BEING BUDDED

NURSERIES AT AGRICULTURAL SCHOOL, ST. LUCIA.

ONE OF THE MAIN WALKS, BOTANIC STATION, ST. LUCIA.

the following table in which are shown the quantities and values of sugar products exported during the last three years :—

	1911.			1912.		
	Quantity.	Value. £ s. d.		Quantity.	Value. £ s. d.	
Usine sugar ...	4,288 tons	52,535	7 0	4,246 tons	48,829	19 11
Muscovado sugar ...	172 „	1,534	16 3	161 „	1,608	13 0
Molasses	74,306 gal's.	1,400	2 1	12,545 galls.	507	12 6
Rum	12,410 „	1,034	3 4	39,109 „	2,603	12 4
Total		56,504	8 8		53,549	17 9

	1913.			
Usine sugar	4,577 tons	65,221	0	0
Muscovado sugar	25 „	291	5	0
Molasses and syrup ...	6,135 galls.	155	0	0
Rum	20,120 „	2,012	0	0
		67,679	5	0

CACAO.

During 1913 the cacao exported amounted to 14,588 cwt., which expressed in 200 lb. bags is 8,170 valued at £36,888. Compared with the returns for 1911 and 1912 there is an indicated falling off of respectively 2,198 and 1,402 bags. It should however, be noted that the average annual output of locally grown cacao for the quinquennial periods ended 1895, 1900, 1905, and 1910 were, respectively, 4,581, 5,070. 7,094 and 8,434 bags of 200 lb., while the average annual output for the three years 1911-13 was 9,370 bags of 200 lb. These figures indicate the probability of the shortage during the last two years being of a temporary nature, due possibly to unfavourable seasons. There is, however, a growing opinion that there has been a steady decrease in the productiveness of peasants cacao due no doubt to a lack of cultivation resulting from the exodus during the past few years of a large number of able-bodied men of the peasant class to Panama and other foreign countries. After visiting a district in which peasants cacao was reported to be showing marked signs of deterioration, the Instructor reported that many of the trees on the properties inspected were old, and in many instances the plantations were suffering more from exposure to wind and unsuitable conditions of soil and treatment generally, than to any extensive activity of diseases as at first suspected. Neglecting to replace shade trees that had died in considerable numbers was also observed to be a contributory cause of many cacao trees failing.

On large estates, planters are paying increased attention to the substitution of *Erythrina velutina* for the more common species which is very subject to a disease locally known as 'Canker'. *E. velutina* has hitherto appeared to be practically immune to this disease, and has long been recommended by this Department as the more suitable cacao shade, and on some estates the work of establishing this species preparatory to cutting out the common species, whether diseased or not, has made good progress and with results that up to the present appear quite satisfactory.

LIMES.

The vital importance of adequate wind protection in the cultivation of the lime tree was referred to in the last report. The Superintendent's duties in the various agricultural districts afford frequent opportunities for observing the state of lime plantations under varying conditions of soil, rainfall, and cultural treatment, and it has invariably been noticed that the most healthy, vigorous and fruitful of the trees in a plantation are those that are the best protected from wind.

That the need for prompt attention to this matter of wind protection is being realized is evidenced by the fact that in several localities, increased efforts are being made to encourage by tillage and manuring the rapid development of existing young windbreaks, as well as the sowing or planting of additional ones. Another matter of great importance that requires the careful consideration of lime growers, is the distance apart at which the trees should be planted. It is now evident on many estates, that the trees have been planted much too close and will have to be thinned out if their fruiting capacity is not to be restricted to the top branches only. When lime planting began in St. Lucia it was thought that from 15 feet to 20 feet apart would be a suitable range of distances, but experience has demonstrated that in our soils the trees develop so well that they would in many instances be quite close enough at 30 feet apart. From 15 feet to 30 feet is evidently the range of distances to have in view when considering the conditions of soil and environment in connexion with all future lime planting in St. Lucia.

Two factories for the concentration of lime juice in steam heated evaporators have been established during the period under review, and two others are in process of erection, these it is expected, will be completed in time for the 1914 crop. There will then be seven such factories in the Island and similar works are likely to be established on other estates in the near future as the lime plantations approach maturity.

The method of concentrating lime juice in steam heated evaporators instead of direct fired tayches, was first demonstrated in St Lucia on the Fond estate where the first steam plant of the kind in the West Indies was installed. The advantages of this process are now sufficiently recognized, so that it is doubtful whether the now obsolete and more wasteful tayche method will ever be used in St. Lucia except, perhaps, where a plantation may be comparatively small and awkwardly situated for the profitable disposal of the raw product to the nearest concentrating works.

In the last Annual Report reference was made to the probability of a marked development in the cropping capacity of the lime estates in the near future. This development is already becoming evident in the exports of lime products for 1913, which reached the value of £3,108 13*s.* 8*d.*—an amount which is £2,123 15*s.* 11*d.* above similar export values for 1912.

Progress in Minor Industries.

Cotton.

A small quantity was again produced in the Choiseul district. The export figures are 4,000 lb. of lint value £200, and 102 cwt. of seed value £30.

Coconuts.

Planting has continued, and preparations are in progress on several estates for further extension of the area under this crop. The quality of the nuts in St. Lucia is, on the whole, very good. With careful selection it is possible to get local nuts of excellent quality for propagating purposes. The local demand for selected seed nuts has been very considerable and the exports in consequence show but a slight increase: 80,097 nuts valued at £234 0*s.* 11*d.* and 69 cwt. of copra valued at £68 18*s.* 4*d.* were exported.

Honey.

Apiarists report that the honey seasons of 1913 have been bad and the production of honey small; only 52,298 lb. of honey valued at £495 16*s.* 8*d.* were exported. These figures are approximately 29,000 lb. and £208 below last year's.

Bay Oil.

A small plant for the distillation of Bay oil has been in operation in Castries during the year and 180 gallons of Bay oil valued at £50 were exported.

The following is a list showing the quantities and value of some of the principal agricultural products exported during 1913 :—

		Quantity.	Value.
Sugar Products :	Sugar, Vacuum Pan	91,547 cwt.	£65,221
	,, Muscovado	503 cwt.	291
	Molasses and Syrup	6,135 galls.	155
	Rum	20,120 galls.	2,012
Cacao	...Cacao	14,588 cwt.	36,888
Lime Products.	Lime juice*	7,968 galls.	2,490
	Essential oil of limes / Otto of limes	158 galls.	336
	Green limes		281
Coco-nut Products	...Coco-nuts	80,097	234
	Copra	69 cwt.	68
Honey ...	...Honey	52,298 lb.	495
Cotton ...	...Sea Island, lint	4,000 lb.	200
	Cotton seed	102 cwt.	30
Spices ...	...Nutmegs	2,771 lb.	43
	Mace	1,029 lb.	50
	Vanilla	691 lb.	94
Various	...Mangoes....		766
	Cassia fistula	1,319 lb.	5
	Kola	5,470 lb.	44
	Logwood	130,569 cub. ft.	3,730
	Pimento sticks	10,685 cub. ft.	367
	Firewood	153,098 cub. ft.	512
	Bay oil	180 galls.	50

*Including concentrated juice.

Instruction in Agricultural Matters.

EXAMINATION IN PRACTICAL AGRICULTURE.

No candidates came forward for the annual examination held by the Imperial Department of Agriculture in connexion with the Reading Courses and Practical Agriculture.

AGRICULTURAL PUPILS.

C. A. Glasgow who was admitted to the Botanic Station on April 22, 1912, as an Agricultural pupil, terminated his course of training on November 1, 1913, in order to take up work on the Fond estate, and the vacancy thus created was filled in January 1914. There are now three pupils attached to the Botanic Station. The educational value of their work has during the year been considerably augmented by the experience they have gained in taking an active part in the practical work of the lime factory, and in view of the development taking place in the lime industry of the island, the knowledge thus acquired is such as may be turned to good account in the near future.

In consequence of the pressure of departmental work in other directions the Superintendent has not been able to devote the usual amount of time to the class-room instruction of the pupils.

AGRICULTURAL LECTURES.

The course of instruction in elementary agricultural science to a class of the senior pupils of St. Mary's College which was commenced last year has been continued. The class was attended at the Botanic Station with satisfactory regularity on Monday afternoons during the College terms. The number of pupils constituting this class is at present ten.

During the earlier part of the year instruction dealing with the principal tropical agricultural products was continued, the crops taken being cotton and fibres generally, rubber, vanilla, and nutmegs. This was followed with such subjects as seed germination, preparation of seed boxes and pans, sowing seeds, germination tests, causes of non-germination of seeds; budding Hibiscus and mangoes, inarching mangoes. Roots and their functions, adventitious roots and vegetative propagation, root-hairs and transplanting, root nodules, root storage, parasitic roots. The soil: sedentary and transported. Agencies of disintegration and formation of soils. The chief constituents of soils: sand, clay, chalk, and humus and their properties.

The pupils show an intelligent interest in the instruction while it is in progress at the Botanic Station.

AGRICULTURAL INSTRUCTION IN THE PRIMARY SCHOOLS.

The following reports on this work for the year 1913 were submitted to the Government by the Agricultural Superintendent in March. They contain evidence of the interest in this useful line of educational work, being satisfactory in the majority of the schools in which the instruction is given.

REPORT OF THE AGRICULTURAL SUPERINTENDENT ON THE TEACHING OF AGRICULTURE IN THE PRIMARY SCHOOLS OF ST. LUCIA, DURING 1913.

The annual examination of the Juvenile Boys' Schools in elementary agricultural knowledge was conducted by an officer of the Agricultural Department during January and February 1914; Mr. R. W. Niles, the Junior Agricultural Instructor, was appointed Examiner.

At each school about three hours was devoted to the oral examination of the classes receiving agricultural instruction, and the inspection of the school garden.

The number of scholars presented for examination was 411, being an increase of 21·2 per cent. on last year's number. Seventeen schools were examined as against sixteen last year. The subject of agriculture has again been taken up at the Resource School; at Saltibus it has unavoidably been neglected owing to changes in the school staff.

The examiner reports improvement in the useful feature of combining with the garden work practical lessons in weights, measures and numerations to which attention was directed in the preceding report.

The outlines of simple experiment and demonstration work given to the Head Teachers last year are reported to have been 'particularly useful in making the garden work interesting.' Useful knowledge is likely to be acquired by the scholars if a few demonstrations or experiments are carefully arranged and carried out so as to be thoroughly understood by them. The teachers will do well to bear in mind that it is desirable to avoid attemptiug too much in this particular line of work, at one time, as there is a danger of the scholars merely seeing and doing work instead of understanding the object in view and assimilating by individual observation, the lessons taught.

Garden note-books were kept in all the schools examined and they furnished interesting and useful records.

It will be observed from the following table, in which is shown the percentage of possible marks awarded each year since the institution of the Agricultural Examinations, that steady and satisfactory progress in the standard of work done is indicated throughout the six years' period :—

Year.	Number of schools examined and marked.	Percentage of possible marks obtained.
1908	19	57
1909	20	61·6
1910	18	68
1911	17	68·2
1912	16	72·6
1913	16	77

EXAMINER'S REPORT.

Castries Anglican Juvenile. The theoretical knowledge in this School has shown improvement, and the condition of the garden and demonstrations in practical knowledge have received proper attention. Grafting and budding have been practised during the year, and various crops grown and experimented with. The fruit trees and ornamental shrubs have received proper care and are in good condition.

Laborie Boys'. The practical work at this School has improved and the demonstrations have been arranged and carried out in a very useful manner. Budding on the orange, hibiscus and rose, and grafting by inarching on the mango have been successfully carried out. Proper attention has also been paid to simple experiments with both English vegetables and native crops grown in the garden.

Dennery Boys'. This garden has been enlarged and is well laid out. The experimental work in connexion with crops was carefully arranged and particular-

ly interesting. In the case of a staking experiment with native Lisbon yams harvested during examination, yams weighing 12½ lb. were obtained from a single mound. There is room for improvement in the theoretical work.

Castries Wesleyan. The condition of this garden, and the arrangement of experiments in connection with the practical work show much carefulness and thought; and the improvement in the practical work has been maintained. A scale and weights should be supplied to this school so that the produce, especially in the case of experimental work, can be weighed in the presence of the boys.

Castries R. C. Juvenile. The practical work in this school has shown improvement, and the garden was cropped with a variety of useful vegetables at the time of examination. Budding and grafting have been practised with success on a few plants.

Rivière Dorée. This garden at the time of examination was in good condition and cropped with a variety of vegetables although the locality was fairly dry. There is room for improvement in the arrangement of the experimental work carried out with the crops.

Vieux Fort. This garden is well laid out and cropped with a variety of useful plants, chiefly native. Proper attention has been paid to experimental work, but there is room for improvement in the theoretical knowledge.

Anse-la-Raye. This garden now consists of two parts: a vegetable garden near the bridge, and an ornamental garden on the site of the garden shown in 1911. Budding and grafting have been successfully practised on several plants in the school garden, and also several budded plants were shown in private gardens in the village and reported to have been done by the boys while at home; this I consider a pleasing and useful feature.

Micoud. The theoretical knowledge has improved and the condition of the garden is good, but the practical work needs attention. The physical texture of the soil in this garden could be improved by the addition of humus in the form of stable manure or green dressing.

Forestiere E. I. M. The condition of this garden is good and a fair quantity of practical work has been done, but the theoretical knowledge of the pupils is still weak.

Soufrière Boys. The theoretical knowledge of the pupils is, on the whole, very good, but the very small size of the school garden makes it impossible to show practical work to balance this.

La Resource Juvenile. Agriculture had been neglected at this school for a year or more, owing to changes in connexion with the Head Teacher, but this year a large garden about 70 feet square was shown. It is well laid out, and cropped with a variety of English vegetables and native crops. The practical work is good, but the theoretical knowledge requires working up.

Mon Repos. The cacao plot which forms a part of this school garden is still worked in a useful manner and the other garden plot has been cropped with a variety of vegetables. The practical knowledge has improved but the theory is somewhat weak. Particular attention has been paid to budding and grafting and this is at present the only school in which the pupils have successfully budded the mango and soursop plants.

La Croix Maingot. The condition of this garden is good, but the practical and theoretical knowledge is poor. The agricultural class is small and a few of the more advanced boys were absent.

Choiseul Boys. A little improvement has been shown in the arrangement of crops in this garden but the unsuitability of the plot for school garden purposes hinders really useful practical work.

Canaries. There is a little progress to record in connexion with this school garden, and there is room for considerable improvement in all branches.

Saltibus Juvenile. This school occupied the third place on the list last year, but owing to changes of the Head Teacher during the year, agriculture has been neglected for some months previous to the exam., consequently, although the school was examined, it was not considered advisable to award marks.

LIST OF MARKS AND STANDING OF SCHOOLS IN AGRICULTURAL TEACHING

Schools.	No. of pupils examined.	Condition and use made of garden.	Practical work and knowledge.	Theoretical knowledge.	Total.	Percentage.	Result note.
Possible marks.		10	10	10	30	100	
Castries Anglican Juvenile	26	10	9	9	28	93·3	E.
Laborie Boys'	48	10	9	9	28	93·3	E.
Dennery Boys'	24	10	9	7	26	86·6	V.G.
Castries Wesleyan	16	9	9	8	26	86·6	V.G.
Castries R. C. Juvenile	64	10	8	8	26	86·6	V.G.
Rivière Dorée Anglican	17	9	8	8	25	83·3	V.G.
Vieux Fort	24	9	8	6	23	76·6	V.G.
Anse-la-Raye	18	8	8	7	23	76·6	V.G.
Micoud	14	8	7	7	22	73·3	G.
Forestiere E. I. M. (a)	7	8	7	6	21	70·0	G.
Soufrière Boys'	55	8	4	9	21	70·0	G.
La Resource Juvenile	10	9	7	5	21	70·0	G.
Mon Repos	17	7	8	6	21	70·0	G.
La Croix Maingot (b)	6	9	6	6	21	70·0	G.
Choiseul	37	6	6	8	20	66·6	G.
Canaries	13	7	5	6	18	60·0	G.
Saltibus Juvenile	15	No marks awarded					
Total	411						

(a) Including 2 girls.
(b) „ 1 girl.

AGRICULTURAL WORK IN THE COUNTRY.

This useful work has been continued and a number of visits to estates, peasants' holdings and school gardens have been made though not on as extensive a scale as formerly.

The large amount of work that was involved in transferring the Department's activities from Union to Réunion, establishing lime nurseries at the new Experiment Station, special duties in connexion with the Réunion estate and the Land Settlement Scheme, and the establishment of the Government lime factory at Castries temporarily reduced the opportunities for the Agricultural Officers to visit the country districts on advisory and instruction work.

Extension of Interest in Agricultural Products.

GOVERNMENT LIME JUICE FACTORY.

The lime factory scheme outlined in the last Annual Report of this Department received the approval of the Secretary of State in March, and the work of establishing the factory was promptly undertaken.

Plans and Estimates of Plant.

Alternative plans and estimates of installations for concentrating lime juice in steam heated or direct fired evaporators were prepared and submitted by the Agricultural Superintendent, and it was ultimately decided, upon the recommendation of the Commissioner of Agriculture, to adopt the original proposal of putting down a steam concentrating plant. The sum of £500 was provided by the Government to meet the cost of the building and plant.

Building.

An iron-framed wooden building on the War Department's lands at La Toc was purchased, and has, with some adaptations, proved to be admirably suited for the purpose. It was dismantled, transported and erected on the reclamation land near the harbour, under the direction of the Colonial Engineer.

Installation of Plant.

The plant was installed under the direction of the Agricultural Superintendent, and by the resourceful adaptation of materials to hand and constant personal supervision it has been possible to complete the factory within the amount allowed.

Plant.

The plant comprises the following:—

1 10 h.p. vertical multitubular boiler with injector and spares.
1 Donkey feed pump.
1 Siddall limes crushing mill for hand or power.
1 Juice store vat.
1 Wooden, steam-heated still.
1 'Ideal' condenser.
2 Wooden steam-heated juice evaporators.
4 Subsiding vats.
1 Rotary juice pump; and various accessories used in handling, measuring, and testing the produce passing through the factory.

THE CIRCLE, BOTANIC STATION, ST. LUCIA.

LOGWOOD APIARY, ST. LUCIA.

Opening of Factory.

The factory was opened for business on November 11. It would have been possible to have opened it two months earlier but for the delayed delivery of some of the appliances ordered through the Crown Agents.

Mill.

A 'Siddall' mill having three iron rollers 2 × 1 foot and fitted with double gearing for hand or power driving is used. It is placed near the side of the building to allow the lime skins from the mill to pass by gravity to the outside so that they are only handled once in being disposed of.

Strainer, Pump and Store Tank.

The juice passes through course and fine strainers at the mill and flows to the pump tank, from which it is lifted by means of a rotary force pump to a storage tank of 500 gallons capacity, in entering which it is again strained. The pump is one of Gould's make, has all parts coming in contact with the juice made of bronze, and delivers by hand power about 5 gallons per minute to a height of 15 feet. It is fitted with rubber suction and delivery hose and is placed in a position for dealing with either mill or subsided juice, the latter reaching the pump tank by gravity. From the storage tank the juice runs by gravity to the still and thence to the subsiders, and later to the pump tank to be pumped up to the evaporators.

Evaporators and Still.

The storage tank, still body and evaporators are constructed of wood, the staves being of wallaba and the bottoms of greenheart. Some difficulty has been experienced in keeping the evaporators perfectly water-tight, but it is probable that this will diminish or entirely disappear as experience is gained.

The evaporators and still are heated by steam coils of copper tubing 1½ inches external diameter, and of lengths to provide 10 square feet of heating surface per 100 gallons of boiling capacity. There are two evaporators, and they have respective capacities of 183 and 107 gallons, and are 2 feet in depth inside. These have been successfully operated with charges of juice equal to 74 per cent. of their full capacity, and the liquid within 6 inches of the top when boiling commenced.

Frothing.

In boiling subsided juice in these evaporators no trouble whatever has been experienced in controlling frothing—in fact no troublesome frothing occurs with rapid ebullition until the final stage is approached, when the tendency to frothing increases as the density of the juice reaches the 'strike' point. This presents no difficulty, however, as the frothing is under perfect control and can be kept at a uniform level by an occasional slight adjustment of the steam supply.

Volume of 'Strike'.

A 'strike' of 62 gallons of finished juice, testing 111 oz. per gallon, has been easily handled in the small evaporator.

Whether it is desirable or practicable to attempt to take off a larger 'strike' than this is a matter for future investigation.

Still Work.

The still, which has a total capacity of 175 gallons, is adapted to take a charge of 100 gallons of juice.

It is connected to an 'Ideal' condenser which works very satisfactorily. The time required to deal with a single charge of juice, including filling and emptying the still, is about 100 minutes, made up as follows: charging and discharging 22 minutes, bringing to the boiling point 34 minutes, distilling 44 minutes. Under

these conditions the volume of the distillate amounts approximately to 10·3 per cent. of the volume of the charge. The yield of essential oil averages ·33 per cent. of the volume of the juice distilled, and about half of the oil comes over during the first ten minutes of distillation. The adoption of a wooden instead of the usual copper still was rendered necessary on grounds of economy in initial outlay. Apart from slight trouble due to an imperfect steam joint, the still has worked satisfactorily ; but a more extended trial is desirable before a decisive opinion can be expressed as to its general efficiency in comparison with a more expensive copper still.

Subsiding.

With the object of producing a product comparatively free from impurities, the juice from the still is run into subsiders of 108 gallons capacity. In these it needs to stand for about ten hours to allow the suspended particles to settle. In practice, the distilled juice entering the subsiders is ready for concentration on the following day. The subsiders used, have an inside depth of $3\frac{3}{4}$ feet, and a convenient position for the tap for drawing off the clear subsided juice is 7 inches from the bottom. The sediment and remaining juice, or 'sludge', is drawn off at a lower tap. Difficulty was at first experienced in recovering the juice contained in the subsider 'sludge', as it failed to filter satisfactorily through bag filters, but a method which promises useful results in the direction of overcoming the difficulty and in reducing the loss of acid to a minimum has been devised and will be given further trial with the object of more thoroughly testing its efficiency and practical value.

The introduction of subsiding into the process of manufacture involves some additional, but as yet undetermined cost in the extra labour required and the loss of acid sustained. For the process to be a profitable one the concentrated juice will have to realize prices sufficiently in advance of that paid for the ordinary product. Efforts are being made to test this point, and it is hoped that our next season's work will be productive of some useful information on the subject.

Preliminary Investigations.

The close attention that had to be given to the details of starting an entirely new feature of the Department's work and the comparatively short time the factory was working have precluded more than preliminary investigations being undertaken in the direction of ascertaining the working efficiency of the several units of the plant. The following information, though lacking the exactness of a long series of observations, is based on the results of actual work in the factory, and is here recorded in the hope that it may be of some use to those of our local planters who have a personal interest in similar lime juice works.

Mill Work.

Under hand power, the mill crushed, on an average, 1·75 barrels of limes per hour Two barrels were sometimes done. An oil engine has been ordered for installation in time for the next crop, and it is expected that the mill will turn out juice in quantity equal to the capacity of the other units of the plant. Under hand power the mill requires two strong men to work it, each taking turns at feeding and crushing.

The juice extracted averaged 7·87 gallons per barrel of limes crushed. The acidity of the mill juice averaged 12·82 oz. per gallon, and ranged from 12·22 to 13·82 oz. per gallon. The acidity of the lime juice purchased ranged from 10·93 to 15·75 oz. per gallon.

The limes and juice purchased were equivalent to 326·7 barrels of fruit, a quantity that is satisfactory, considering that operations were started so near the end of the crop season.

Juice Concentration.

The degree of juice concentration averaged 8·6 to 1.

Although the factory has not been worked at its full capacity, results have been obtained which indicate that with an average steam pressure on the boiler of

40 lb., and under good working conditions, the plant is capable of evaporating 38·35 gallons of water per hour. This quantity is equivalent to dealing with 43·4 gallons of raw juice, which with a concentration ratio of 8·6 to 1 would produce 5·04 gallons of concentrated juice. It seems probable that under favourable conditions the boiler would work an additional evaporator, by which means the evaporating efficiency of the plant could be appreciably increased if necessary.

Condenser Work.

At the trial of the still under normal conditions, and with the distillate coming over at the rate of 1 gallon in 3·5 minutes, the volume of water that was required to operate the 'Ideal' condenser satisfactorily was 4·5 gallons per minute or 15·75 times the volume of the distillate. With less than this rate of flow through the condenser it showed a tendency to become warm near the vapour intake.

Factory Loss of Acid.

Preliminary experiments to ascertain the loss of acid that occurred during concentration were carried out. The results of three separate trials indicated an average loss of 2·28 per cent of acid. On each occasion the juice used was carefully measured and tested for acid before and after concentration.

The loss of some acid from various causes in the processes connected with the preparation of concentrated juice is unavoidable, and the problem of reducing this loss to a minimum appears to afford a field for useful investigation work. A beginning in this direction has been made by ascertaining the total loss of acid that has occurred at the factory during the period under review. The work involved the chemical testing of average samples of mill juice from each crushing, besides a large number of other samples, together approximating a total of over 100 The results show that the total unavoidable loss of acid during the period under review was 10·02 per cent. Considering the loss that must have occurred through leakage, imperfect filtering, and in handling generally, these results indicate that the loss in concentrating was very low, as the above-mentioned experiments demonstrated. These results have the appearance of being very satisfactory for a beginning, though they may possibly be improved upon when more experience has been gained.

Factory Business.

The business of the factory is conducted on a co-operative basis. In determining the profits there is deducted from the amounts realized for the sale of produce the amounts paid for the purchase of limes and lime juice together with all expenses of working the factory and disposing of the produce, and, in addition, a sum equivalent to 10 per cent. of the amount paid for the purchase of limes and lime juice, the remainder being regarded as gross profits to be divided; one-third being paid to the Government and two thirds to the vendors of fruit and juice, this latter to be distributed to the vendors by way of bonus, in proportion to the amounts paid to them for limes or lime juice.

The sum equivalent to 10 per cent. of the value of the limes and lime juice purchased, together with the sum representing one-third of the profits referred to in the foregoing paragraph, to be paid to the Government by way of interest and sinking fund in respect to the sum expended in erecting the factory.

The price paid for limes and lime juice is based on a scale of prices having a relation to the value of concentrated juice, and insuring a safety margin of profit to the factory. The seller of fruit realizes his full value when he gets his bonus derived from the share of profits.

Owing to the unusually high prices for concentrated juice ruling at the time of opening the factory, fruit and juice were purchased on the basis of £24 per standard pipe of concentrated juice, arrangements being made to make a deferred payment to vendors in the event of the produce selling above this figure. During the short trial run of the factory, the produce dealt with was 233 barrels of fruit and 736 gallons of raw juice.

The produce shipped was 255·75 gallons of concentrated juice, which realized £114 4*s.* 1*d.* net. The amounts to be paid to vendors as deferred payments on produce purchased, and as bonus, are respectively £20 16*s.* 8*d.* and £10 1*s.* 2*d.* The bonus is equal to nearly 12½ per cent. on the total amount paid for the purchase of produce. Taking the bonus into calculation, the total payments to vendors will be equivalent to 5*s.* 8½*d.* per barrel of limes and 8½*d.* per gallon of standard raw juice.

The amount of the Government's share, calculated as described above, will be £13 2*s.* 1*d.*

EXHIBITIONS.

CANADA.

St. Lucia was represented at the Canadian National Exhibition held at Toronto in August 1913, and took part as a unit of a combined West Indian Court. Owing to the resignation of the Secretary of the local Permanent Exhibition Committee, the Agricultural Superintendent was requested by the Administrator to assume charge of the business connected with the representation of St. Lucia. The collection of exhibits sent, comprised chiefly exportable agricultural products, special attention being paid to the exhibition of green limes in quantity sufficient to admit of the fruit being distributed free at the exhibition.

The arrangements made provided for the display of posters, some describing the principal products of export, the products which could be produced in St. Lucia in exportable quantities in the event of there arising a profitable demand for them, and others giving the names of local producers and firms exporting St. Lucia products.

A supply of pamphlets entitled Hints to Settlers in St. Lucia was sent for free distribution to responsible persons.

The St. Lucia exhibit was awarded a Diploma of Merit, and a Bronze Medal.

ENGLAND.

The Agricultural Superintendent has also been requested to make the necessary arrangements for St. Lucia to be represented at the Tropical Products and Rubber Exhibition to be held at the Agricultural Hall, London, from June 24 to July 9, and preparations for the Colony to take part as a unit of a West Indian Court are in progress.

Special Investigations by Agricultural Officers.

PUBLICATION OF WORK.

The Assistant Agricultural Superintendent prepared a paper on Citrus Cultivation which was published in the *West Indian Bulletin*, Vol. XIII, No 1, under the title of A Plea for Citrus Cultivation in St. Lucia. Advance copies of the paper were supplied by the Commissioner of Agriculture and these were distributed free to planters and others in the Colony, who were likely to be interested in the cultivation of citrus fruits.

Reference to this paper is also made in the *Agricultural News*, Vol. XII, No. 301.

The following report on the lime cultivation experiments referred to in the previous Annual Report has been submitted by the Assistant Agricultural Superintendent :—

LIME CULTIVATION EXPERIMENTS.

The lime cultivation experiment plots at Corinth have been maintained during the year. Details of the laying out of these plots were published in the last Annual Report.

Series No. I. Tillage Experiments.

The object of this series is to ascertain the effect of certain methods of cultivation on the general health and productiveness of the trees.

Plot 1. Farmed. Such crops as cabbage and corn followed by heavy crops of green dressing (*Canavalia ensiformis*) have been regularly grown between the trees. The lime plants in this plot were reported as being of a yellowish hue during October. This was probably due to the excessive dampness of the soil at the time, as the soil in this plot is distinctly heavier than the adjoining plots. This yellowness had entirely disappeared in February and the trees appeared in vigorous growth.

Plot 2. Primary Shade. Seeds of *Ricinus Communis* Zanzibar (Castor Oil) were sown thickly throughout this plot; the plants grew to a height of 4 to 5 feet.

Plots 3 and 4. Hoed and Cutlassed respectively. These plots were hoed and cutlassed simultaneously when necessary.

The general condition of all the plots has greatly improved during the year. At the time of laying out these experiments—eighteen months ago—it was possible to stand at one end of the field and see through every tree in this section. The trees were thin and yellow and in many instances the upper branches were leafless. Plot 2 was also badly infested with the snow and mussel scales. This plot has shown the greatest improvement during the year. The trees are, comparatively speaking, free of scale pests, and the yellowish hue has been replaced by abundance of deep green foliage.

Samples of soil have been taken from each plot at a depth of 18 inches and the shrinkage tests* were as follows :—

Plot	1	shrinkage	14	per cent.
,,	2	,,	10	,,
,,	3	,,	11	,,
,,	4	,,	12	,,

The general health of these plots is clearly related to the soil shrinkages : the lower the shrinkage the greater the health of the trees. The more one uses this ready and convenient method for ascertaining the suitability of a soil for any particular crop—other conditions being favourable - the greater is one impressed by its reliability and usefulness. These tests will be continued at regular intervals to ascertain if any marked change has been brought about in the physical condition of the soil by the various methods of tillage adopted.

*See *West Indian Bulletin*, Vol. XII, p. 50.

SERIES NO. 2. MANURIAL EXPERIMENTS.

Plot A. Manured. This plot received stable manure at the rate of 2 baskets per tree.

Plot B. Mulched. This plot received cutlassed grass and weeds at the rate of 4 baskets per tree.

Plot C. Control. This plot was cleaned when necessary at the same time as plots A and B, but did not receive manure or mulch.

The general condition of these plots is good but no change is yet evident from the treatment they are receiving; this can scarcely be shown for a year or so. Careful records will be made of the fruit gathered from each plot during the year, and if this is continued for a number of years, some reliable information should be forthcoming.

Details of Administration.

STAFF CHANGES.

Mr. N. Rawlins resigned the post of copyist on September 18, and was succeeded by Mr. W. Arno whose appointment dates from October 1.

CORRESPONDENCE AND DISTRIBUTION OF INFORMATION ON AGRICULTURAL MATTERS.

The number of registered communications dealt with at the Superintendent's office was 3,450. This total comprises 1,530 letters, minutes and reports, 720 meteorological records, and 1,200 orders and vouchers.

The *West Indian Bulletin* has been regularly distributed free to fifty-seven recipients, and about 150 copies of A Plea for Citrus Cultivation in St. Lucia have been sent out free to planters and others interested.

The Foreman of the Botanic Station, as the local agent for the publications of the Imperial Department of Agriculture, has continued the usual distribution, by sale, of the *Agricultural News* and various pamphlets.

ADDITIONS TO THE LIBRARY.

Copies of the publications of the Imperial Department of Agriculture for the West Indies; Bulletins of the Royal Gardens, Kew, and of the Agricultural and Botanical Departments of British Guiana, Trinidad, Jamaica, Malay States, Ceylon, Missouri, and Surinam; the *Agricultural Ledger*; the United States *Experiment Station Record*; the *Phillipine Agricultural Review*; *Journal of Agricultural Research*; and various pamphlets and reports have been received and filed.

ADDITIONS AND REPAIRS TO BUILDINGS.

The buildings of the Department have been kept in repair. The house at Union was dismantled and re-erected with some alterations and extension on the land of the Experiment Station at Réunion ; the work being done by the Colonial Engineer's Department.

EXPENDITURE, RECEIPTS, SALE OF PLANTS, ETC.

Expenditure.

The expenditure in connexion with the Agricultural Department was as follows :—

	£	s.	d.
Personal emoluments	623	2	0
Forage, subsistence, and transport allowances to Agricultural Officers	129	13	4
Allowance to agricultural pupils	47	12	0
Labour, Botanic Station and Experiment Station	397	8	2
Seeds, plants, manures, etc.	12	8	3
Tools and sundry requisites	32	3	8
Printing and binding	11	11	7
Upkeep, garden seats and water service	2	7	11
Material for repairing walks and draining lawns	13	15	1
Maintenance of mule, donkey and vehicles	27	17	7
Telephones	24	4	6
Watering hose	3	15	2
Flower pots	8	16	6
Contingencies	4	8	6
Total	1,339	4	3

Receipts.

The amount derived from the sale of plants, seeds, produce, etc. from the Agricultural Stations was £108 16*s*.

OFFICIAL VISITS TO THE STATION.

The Imperial Commissioner of Agriculture visited St. Lucia in May, November, and December and paid official visits to the Botanic Station, the Lime Factory and the Experiment Station. He also inspected cultivations in the Marquis and Babonneau districts and passed through considerable areas of uncultivated land that appeared to possess considerable possibilities for the extension of lime growing by the numerous small land owners in this part of the island.

The Mycologist made, between January 15-23, a tour of some of the important agricultural districts, and while making a survey of local conditions in regard to plant diseases generally, gave particular attention to the root disease which attacks cacao and a wide range of useful trees, and to the immortel canker.

MISCELLANEOUS MATTERS.

An attempt to record the number of persons visiting the Botanic Station during the course of the year has been made.

As it was not possible to detail a person specially for this work, the results are only approximate. They nevertheless indicate the extent to which the Gardens are

used by the public. The following figures refer to persons visiting or passing through the Gardens. The number for the year ended March 31 was 41,831, giving a monthly average of 3,486. The lowest recorded number was 1,704 for February and the highest, 5,000 for August.

A further supply of mongoose has been introduced and the animals were distributed by the Agricultural Department to various parts of the island: 200 animals were received between March and July, and 183 of these arrived alive and were liberated. The cost of the service was £13 0s. 9*d*. The animals were obtained from Barbados through the kind co-operation of the Commissioner of Agriculture.

LOVE VINE (*Cuscuta* sp.).

Efforts have been continued to persuade the people occupying land having trees infested with Love Vine to destroy this parasite but, with a few exceptions, the advice given by the agricultural officers has not been acted upon, and the pest continues to flourish.

An Ordinance, No. 19 of 1913, Amending the Plants Protection Ordinance No. 12 of 1909 was enacted in December, and a Proclamation dated April 18, 1913, and published in the *Official Gazette* of April 25, declared the Love Vine to be, throughout the Colony, a pest within the meaning of the Ordinance No. 12 of 1909.

METEOROLOGICAL RETURNS.

The rainfall returns for the island compiled from records furnished by voluntary observers, and the meteorological observations recorded at the Botanic Station are included in this report.

RAINFALL.

Three additional observation stations from which records have been received during the year are Réunion, Ruby, and Crown Lands, all on the leeward side of the island. Records are now received from thirty stations.

The monthly rainfall returns have been regularly published in the *Official Gazette*, and copies sent to all observers, who have also been supplied with the necessary record books and stationery.

The average annual rainfall for the island (25 stations) was 83·75 inches.

At eleven interior stations the average was 106·65 inches, and at fourteen stations near the coast it was 65·76 inches.

The highest recorded rainfall was at Warwick, with 140·60 inches, and the lowest at Beausejour, Vieux Fort, with 48·50.

Unusually dry weather occurred throughout the island during December.

TEMPERATURE, BOTANIC STATION.

The mean monthly temperature in the shade was 78·2° F. The maximum shade temperature of 89·5° F. was recorded on May 19 and September 4, and the minimum of 62° F. on February 19.

BAROMETER, BOTANIC STATION.

The mean monthly readings of the barometer, corrected for instrumental error, temperature, and altitude, ranged between 29·932 for November and 30·098 for March. The mean annual pressure was 30·015 inches.

J. C. MOORE,
Agricultural Superintendent.

Appendix.

ST. LUCIA.

REGULATIONS MADE BY THE GOVERNOR IN COUNCIL FOR THE SALE OF CERTAIN CROWN LANDS IN THE ISLAND OF SAINT LUCIA UNDER THE AUTHORITY OF THE CROWN LANDS ORDINANCE, 1878, AMENDMENT ORDINANCE, 1913.

[31st December, 1913.]

1. These Regulations shall apply to the Crown Lands known as Réunion, Valois and Le Riche, situate in the quarter of Choiseul in the Island of St. Lucia hereinafter called ' The land '.

2. The land shall be surveyed before any allotment of it is made, and the administration and disposal of such land and of all details connected therewith shall, subject to these regulations and to such orders as may be given by the Governor, be entrusted to an officer herinafter styled the ' Land Officer.'

3. In making the survey the following Reserves shall be made :—

(1) All ponds and wells, the beds and banks of rivers and of any important stream or tributary, and a space of half a chain around the source and on either bank thereof :

(2) Swamps. exposed ridges, and such forest as may be deemed necessary for the purpose of Forest Conservation :

(3) Such land as on recommendation of the Imperial Commissioner of Agriculture the Governor in Council may approve as being necessary and desirable to be reserved for the uses of the Agricultural Department of the Colony :

(4) Such land as may be necessary for roads or paths to each allotment or group of allotments :

(5) Such land as may be requisite for villages :

(6) Any continuous tract of altogether precipitous or uncultivable land :—

(7) Such land for any other public purposes, as the Governor in Council may approve as necessary or desirable for the general good.

4. The remainder of the land shall be divided into allotments of not less than two, and not more than five acres each, and no allotment shall exceed five acres except with the approval of the Governor in Council. In surveying the land for allotment the Surveyor shall as far as possible include in one allotment any cultivation of an existing tenant on the land.

5. Each allotment shall be numbered and shall have its number clearly displayed on some part of it.

6. Every corner of each allotment shall be marked by iron pegs and the general outline by dragon's blood or immortelle plants, which plants shall be carefully tended by the allottee.

7. When the survey is complete the Land Officer shall proceed to value each allotment. and shall as soon as possible submit to the Governor a list of the allotments with the value of each. On approval of the valuations by the Governor in Council the value of each allotment shall be recorded in a Register to be kept as hereinafter provided.

8. The Land Officer shall then by notice in the *Gazette*, and by means of Posters, or in any other way he may deem desirable, invite applications in writing (which must be made on a printed form to be obtained from the Land Officer), for allotments, and on the expiration of 30 days from the date of the notice shall proceed, subject to the Governor's approval, to allot the same in accordance with the following regulations; Provided, however, that he shall not make an allotment of land to any person who is already an owner of land without the sanction of the Governor. Every person to whom an allotment is made shall be given a conditional permit of occupation in the form annexed to these regulations.

9. In selecting applicants for allotments priority shall be given first to those who are prepared to pay down the whole value of the lots, and secondly to those who are prepared to pay not less than 20 per cent. of that value, taken in order of date of application: Provided, that an existing tenant shall have the first choice of purchasing the allotment within which his cultivation falls, unless the Governor, on the report of the Land Officer, shall decide that such tenant is otherwise ineligible.

10. The remainder of the purchase money of an allotment on which 20 per cent. or more has been paid shall be divided into eight equal parts, and the allottee shall on the expiration of the second year from the date on which his conditional permit of occupation (which will be the date of the first payment on account) was issued to him by the Land Officer, and thereafter on the same day in each year, for eight consecutive years, pay annually, as an instalment, one of those parts.

11. When all the applications from persons who are able to pay cash or not less than 20 per cent. of the purchase money have been dealt with, the Governor may, in his discretion, allot to the other applicants, according to the dates of their applications, the remaining lots of land, if such applicants be recommended by the Land Officer, and considered eligible by the Governor.

12. Such persons shall receive from the Land Officer a conditional permit of occupation of the allotment in respect of which they have been selected on condition of paying for such allotment one-tenth part of the purchase money; and at the expiration of one year from the date of such permit and at the same date in each succeeding year, a further one-tenth part of the purchase money shall be payable.

13. The Land Officer shall keep a Register in the form approved by the Governor in which shall be recorded in parallel columns—

(*a*) the number, area, and value of each allotment,
(*b*) the name of the allottee,
(*c*) the date of the allotment,
(*d*) the amount paid previous to allotment,
(*e*) the sums paid on account of instalments and the dates of such payments,
(*f*) any other information which the Governor may prescribe.

14. An allottee may at any time pay off any instalments outstanding. An allottee may at any time pay on account of any instalment any sum not less than four shillings.

15. The conditions of tenure of allotments shall be as follows:—

(*a*) Every purchaser shall for a period of 10 years reckoning from the date of allotment reside ordinarily in the island of St. Lucia, commencing to do so within not more than three months after obtaining a conditional permit under these regulations, unless the Land Officer, with the approval of the Governor, shall otherwise permit.

(*b*) No land may be alienated, let, or incumbered, for a period of ten years from the date of allotment without the consent of the Governor. The word 'alienated' does not refer to or include an involuntary alienation as in the case of descent or bankruptcy; nor an alienation partly involuntary as in the case of a devise by will.

(*c*) No exclusive right shall vest in any person to any spring, stream, pond, well, or other natural source of water situate in or flowing through any land.

(*d*) The Governor may at any time resume possession of any part or parts of an allotment not exceeding one-tenth of the said allotment, for roads, on paying therefor at the same rate per acre as that at which the allotment was originally sold, and also for the value of such crops as may be on such selected line or road.

16. On failure by an allottee of an allotment to comply with any of the conditions of tenure hereinbefore detailed, the Land Officer shall immediately report all the facts of the case to the Governor, who shall enquire as fully as possible into all the circumstances of the default, whereupon the Governor in Council may order that the right to such allotment and all crops and all instalments paid, and all other rights of the allottee, shall be forfeited, without any appeal to any Court, or may make such other order as the circumstances of the case may require.

17. Notice of an order so made shall be served upon the allottee or left at his last known place of abode, and no act of re-entry shall be necessary, and such allotment or house spot shall be at the disposal of the Governor, either to re-sell then, or at any future time.

18. On payment in full by an allottee of the purchase money of an allotment he shall be entitled to a grant of the same. Every grant of land shall be deemed to be subject to an exemption from sale of, and a reservation to the Crown of the ownership of, and the right to search for and get, all petroleum which may be found on or under such land. Grants shall be recorded in the Registry of Deeds Office free of all cost to the allottee, except stamp duty, if any.

Made by the Governor in Council this 31st day of December, 1913.

SAMUEL OKELL,
Clerk of Councils.

REPORT ON THE WORKING OF RÉUNION ESTATE FOR THE YEAR ENDING MARCH 31ST., 1914.

RÉUNION ESTATE,
Choiseul, Saint Lucia,
March 31st, 1914.

Sir,

I have the honour to submit, in quadruplicate, a report on the working of Réunion Estate for the year ending March 31st, 1914.

PURCHASE.

2. This property was purchased by the Government at public auction for a total sum of £1,743 on February 22nd, 1913, and I assumed the duties of Officer-in-Charge in conjunction with the duties of my substantive office on March 3rd.

BUILDINGS.

3. Upon careful inspection of the sugar works it was found that fairly extensive repairs would have to be carried out to enable the cane grown by the Metayers to be handled in accordance with the terms of purchase.

4. The mill and water wheel—by Fletcher & Co, London—is one of the largest and best of its kind in the island and is in excellent working condition.

5. The battery consisting of three large copper and two small iron tayches had to be entirely dismantled and rebuilt. The copper tayches having been burnt in a few places were patched before being re-erected.

6. The whole of the plant has now been put into thorough repair and should not need any serious expenditure for many years to come.

7. The buildings, however, require careful attention to bring them into good condition. To undertake the whole of this work at one time would entail a somewhat heavy expenditure which the present sugar crop does not justify. I therefore recommend that this work be done gradually until these buildings are in good condition.

8. In making the above recommendation I am looking more to the future than the present. Choiseul and the surrounding districts are in every way as suitable for the cultivation of limes as many of the lime districts in the neighbouring island of Dominica *provided that the same care and attention be given to the question of wind-belts, as is done in the latter island.* In this connexion I should like to mention that the rainfall in these districts is quite sufficient for the successful cultivation of this crop; and to correct the erroneous impression which exists locally on this point I would add that some of the largest and most prosperous lime estates in Dominica receive only an average annual rainfall of between 60 to 70 inches.

9. Our policy, therefore, in connexion with the repairs to these buildings should be guided by the above knowledge so that in the event of the lime industry extending in this quarter, the Government would have in readiness a large factory capable of meeting the demands of small growers along the Leeward coast who are at present debarred from the advantages offered by the factory in Castries owing to difficulties of transport.

10. The dwelling house was found to be in an unsafe condition and a large portion of it beyond repair. It was therefore decided to take it down and to erect quarters for the Junior Instructor and Field Overseer from the sound material.

11. Accommodation for the Officer-in-Charge who is also Assistant Agricultural Superintendent was provided by the removal of his former quarters from Union.

12. The whole of the work in connexion with the Officers' Quarters was carried out by the Public Works Department.

Introduction of New Cane Varieties.

13. Attention has been given to the introduction of new cane varieties for the purpose of ascertaining the varieties best suited to this district, and with the object of rendering the present cultivation more profitable.

14. Seven quarter-acre plots were laid out and planted up with the following: D. 109, D. 625, D. 116, B. 147, B. 376, B. 208 and the local White Transparent. Plant canes of the first six varieties were obtained through the Agricultural Superintendent at St. Kitts.

15. Records will be carefully kept as to the suitability of these varieties for local conditions, and later on cuttings will be distributed to Land Settlement Holders.

Tenants.

16. Seeing that many months would have to elapse before the necessary legal arrangements could be made for the disposal of the land under a Land Settlement Scheme, arrangements were made to rent out for one year as much of the land as possible to peasants, for the cultivation of ground provisions, at a rental of eighteen shillings per acre.

17. Other land near the Choiseul River and village boundary being unsuitable for general cultivation has been reserved for house sites, at a monthly rental of one shilling. Twelve sites have already been taken up and others are likely to follow.

18. A sum of £23 15*s.* 4*d.* has been received from these tenants during the year.

Agricultural Department.

19. About 60 acres of land near the south-eastern boundary of the village has been reserved for the use of the Agricultural Department, to make possible the removal of the Experiment Station and Plant Nurseries from Union, where the frequency of flooding has proved such a handicap to the general work of the Department. This transfer has left the spacious buildings at Union—which were no longer required for the use of this Department after the closing of the school there—free for other public purposes.

20. The details in connexion with this transfer and the laying out of the new Station at Réunion are dealt with at length in the Annual Report of the Agricultural Department for the year 1913-14.

Village Extension.

21. Choiseul is the most densely populated village in St. Lucia and until the purchase of the Réunion Estate by the Government no relief from this congestion was possible owing to the high price asked by the owners for the land adjoining the village.

22. To improve this condition a block of six acres of land belonging to the Réunion Estate and adjacent to the north-western boundary of the village has been surveyed and will shortly be available for village purposes.

Government Reserve.

23. A narrow strip of land comprising about three acres running along the Eastern boundary of the village and separating the latter from the new Experiment Station has been reserved for the present as it was deemed unwise to dispose of the land immediately adjoining the village until its requirements were more fully known. In the meantime this land is being worked by Metayers.

Land Sales.

24. A piece of land comprising fifteen acres adjoining the Trou Babet River and bounding with the new village extension was sold to the Rev. Father Roger for £120, this land being desired for Parish purposes only, such as the building of new schools which at present are situated in an unsuitable locality.

25. The section of land known as 'Cleonne' was upon survey found to contain only twenty-nine acres as against the 'forty-one, more or less' as advertised in the sale notice. Owing to this section being so far from the remainder of the estate—some two miles along the road to Soufrière—it was decided to dispose of it in small areas to the adjacent peasant proprietors. For this purpose it was divided into three lots and sold for a total sum of £145, thus a little more than covering its original cost and subsequent expenses incurred in connection with the survey.

Public Road Diversions.

26. The danger which existed to travellers between the villages of Choiseul and Soufrière created by a precipitous chasm encroaching upon the northern side of the main driving road near the former village has been removed by diverting the road through the lands of Réunion Estate. This improvement was only made possible by the purchase of this property, the price formerly asked for the necessary piece of land to carry out this work being prohibitive.

27. Land necessary for the northern approach to the Choiseul Bridge now being erected has also been procured without having to meet legal claims of compensation to private owners.

Land Settlement.

28. Land settlement schemes have been established in Grenada and St. Vincent during the last few years and it was decided to give a similar scheme a trial in St. Lucia. With this object in view 165 acres of the Réunion, Valois and Le Riche land was surveyed and divide into 47 lots ranging from 2 to 5 acres each. Roads are being laid out throughout this area to give each allottee a right of way.

29. Regulations for the sale of these lots were made by the Governor in Council and published in the *Official Gazette* of December 31st, 1913. The administration and disposal of these lots is entrusted to the 'Land Officer' subject to such orders as may be given by the Governor. The duties of this officer have been undertaken by the writer.

30. Upon the valuation of these lots being approved by the Governor in Council, the Land Officer will invite applications for them and proceed to allot the same in accordance with the Regulations.

31. The close proximity of the new Agricultural Experiment Station and Plant Nurseries where all kinds of cultivation and agricultural operations are in daily progress should be of practical assistance to the land settlement holders, and the Land Officer who resides on the estate is available and willing at all times to render any assistance that lies in his power. It is sincerely hopd that this scheme will meet with the co-operation of the peasants and enable them to work their holdings on more lucrative lines and be the means of checking—even in a small measure—the daily emigration from the island.

Receipts.

A total sum of £260 17*s.* 6*d.*, has been received from the following sources during the financial year ending March 31st, 1914 :—

	£	s.	d.
Sale of Land	165	14	3
Rents	23	15	4
Crop A/c.	71	1	3
Miscellaneous		6	8
	£260	17	6

VALUATION OF LAND SETTLEMENT LOTS AT 'REUNION' 'LE RICHE' AND 'VALOIS' CHOISEUL.

Lot.	Area.	Apprized value. £ s. d.
1	3 0 34	22 15 0
2	4 1 21	29 15 0
3	3 2 03	24 10 0
4	2 3 16	11 0 0
5	3 1 20	22 15 0
6	3 1 36	17 10 0
7	3 1 28	24 10 0
8	4 3 12	33 5 0
9	2 3 04	19 5 0
10	3 2 36	27 12 6
11	3 0 20	23 8 6
12	3 0 18	18 15 0
13 14	6 0 26	45 18 6
15	3 1 11	22 15 0
16	2 2 14	18 15 0
17	4 3 14	35 12 6
18	4 3 14	35 12 6
19	4 2 05	33 15 0
20	3 0 00	22 10 0
21	3 3 37	30 0 0
22	4 3 11	33 5 0
23	2 1 19	13 10 0
24	2 0 16	14 17 6
25	4 8 37	31 10 0
26	5 0 04	35 0 0
27	4 3 01	33 5 0
28	4 1 32	31 10 0
29	2 1 17	15 15 0
30	4 3 01	33 5 0
31	6 2 34	47 5 0
32	2 0 29	15 18 6
33	2 1 14	16 17 6
34	2 0 05	15 0 0
35	4 1 10	31 17 6
36	4 0 35	21 5 0
37	3 1 11	16 5 0
38	2 1 11	11 5 0
39	2 2 17	15 0 0
40	3 3 14	22 10 0
41	3 2 12	21 0 0
42	2 3 15	16 10 0
43	2 2 36	16 10 0
44	2 1 15	13 10 0
45	3 1 13	19 10 0
46	4 0 01	20 0 0
47	3 3 34	20 0 0
	Total ...	£1,112 0 6

(Sgd.) ARCHIBALD J. BROOKS,
Land Officer.
4. 4. 14.

Valuations approved by the Governor in Council, under the Regulations dated 31st December, 1913, this 8th day of May, 1914.

(Sgd.) SAMUEL OKELL,
Clerk of Executive Council.

RAINFALL RETURNS, SAINT LUCIA, 1913.

Observation Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Maximum in one day and date.		No. of days on which rain fell.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.		
Bounth Estate	11·43	2·02	4·65	3·23	1·88	6·64	4·72	17·09	7·50	9·39	8·71	2·16	79·42	5·68	Jan. 10th	279
Marquis „	13·99	2 41	4·65	3·55	2·75	5·74	5·80	14·37	6·43	13·37	6·67	2·03	81·76	6·54	Jan. 9th	197
Union Experiment Station ...	15·04	3·02	4·69	3·71	3·23	7·28	5·06	17·36	8·29	13·14	9 13	3·00	92·95	3·97	Jan. 9th	239
Botanic Station	14.12	2 66	5·82	3·64	3·24	7·03	5·01	15·65	7·72	10·76	10·59	3·29	89·53	4·18	Aug. 25th	266
La Pensée, Castries ...	15·27	2 89	5·69	4·23	2·99	7·52	5·51	17·53	8·97	10·98	11·61	3·27	96·46	3·95	Aug. 25th	263
Cul-de-Sac Factory ..	...	..	No	returns	...	...	...	...	7·78	11·49	12·65	3·75	35 67*	2·89	Nov. 18th	...
Belair Estate, Roseau ...	13 35	3 25	6·48	3·02	2·88	5·95	5·49	17·27	8·34	11·62	12·40	2·55	92·60	4·10	Aug. 26th	153
Uplyme Est, Anse-la-Raye .	19·49	3·56	11·25	5·94	6·59	10·84	7·85	20·02	12·52	19·38	18·13	3·74	139·31	4·64	Aug 25th	301
Invergoil „ „ ...	9·98	2·00	4·68	2·13	2·24	5·42	3·33	14·19	6·30	9·45	10·23	·96	70·91	4·70	Aug. 25th	233
La Perle „ Soufrière ...	14·88	3·33	9·62	3·00	3·59	11·83	8·98	17·59	12·78	11·53	10·17	2·52	109·82	5·53	Aug. 25th	240
Rivière Dorée, Choiseul ..	11·82	1·09	4·50	2·94	1·94	5·08	6·35	13·82	7·25	11·47	8·20	2·09	76·55	5 09	Jan. 9th	178
Parc Estate „ ...	15·63	2·33	9·15	5·43	2 75	9·83	11·87	13·50	10·93	11·50	13·93	2·96	109·81	4·14	Jan. 10th	216
Warwick „ „ ...	21 21	3·37	14·58	6 53	6 27	11·98	14·12	15·74	12·91	14·97	13·99	4·93	140·60	6·74	Jan. 14th	258
Woodlands „ ...	18·94	2·77	9·07	8·79	5·13	10·47	12·53	14·93	10·97	14·08	12·49	3·68	123·85	5·80	Jan. 9th	238
Réunion „ „ ..	No	returns	3·80	3·05	2·17	5·39	6·06	13·07	7·95	12·00	10·06	2·18	65·73*	3 95	Aug. 25	215*
Black Bay Est., Laborie ...	11·00	1·70	1·93	2·60	1·30	3·56	3·73	10·65	3·82	7·45	6·38	1·55	55·67	3·65	„ 25	117
R Traite „ Vx.-Fort ...	13·38	1·30	3 00	2·86	1·43	4·55	5·46	11·74	6·43	8·99	7·04	2·09	68·27	4·37	Jan. 9th	142
Moule-á-Chique „ ...	10·70	·10	1·25	1·13	1·00	2·20	3·06	8·88	2·70	14·46	6 28	·59	52·35	4·30	Jan. 9th	94
Beausejour Est., „ ...	7·73	1 48	1·75	2·25	·81	2·89	3·88	7·66	4·32	8·07	6 29	1·37	48·50	2·50	Aug. 25th	143
Pointe Sable Est., „ ...	12·57	·25	1·30	1·35	1·63	3 38	4·34	11·31	5·73	7·01	5·38	1·19	55·44	4·20	Aug. 25th	110
St. Urbain „ „ ...	10·49	1·41	3 38	1·61	1·47	4 05	3·87	8·87	5·41	8·44	7·87	1·73	58·60	3·40	Jan. 9th	160
Troumassée „ Micoud ...	9 45	·67	3·41	1·66	1·82	4·79	3·61	7·05	7·34	9·27	6 42	·84	56·33	3·65	„ 9th	133
Fonds Estate, „ ...	10·26	1·49	3·56	3·52	2·44	5·09	3·52	10·67	5·96	8·82	8·13	1·57	65·03	3·24	„ 9th	189
Mamiku „ Dennery ...	8·70	1·00	2·09	1·58	3·00	4·96	3·99	8·47	5·62	13·75	6·14	2·20	61 50	3 36	„ 9th	244
Errard „ „ ...	13·52	2·05	5·44	4·25	4·62	6·59	4·38	16 79	7·75	16·86	9 60	3·12	94·97	5·74	„ 9th	294
La Caye „ „ ..	8·91	1·53	2·99	2·22	2·47	4·91	3·44	12·52	5·70	10·74	8·60	1·47	65 50	3 96	Aug 25th	123
Fuesneau Castries ...	14 36	4·42	6·73	5 68	4 03	7·87	8·62	16·67	10·27	13 42	12·54	3·55	108·16	4·03	Jan. 9th	273
Crown Lands, Cul-de-Sac ...	...	...	No	returns	...	...	...	...	5·27	16·21	12·64	4·97	39·09*	2·32	Nov. 12th	...
Soucis, „ ...	13·33	2·75	No	returns	...	...	...	...	8·41	12·62	12·36	No	returns*	...		...
Ruby, Soufrière	...	...	No	returns	...	...	...	...	...	11·08	11·47	2·61	25·16*	3·55	Nov. 12th	...

*Returns incomplete.

METEOROLOGICAL RETURNS FOR 1913.

BOTANIC STATION, ST. LUCIA.

Long.—60° 59′ 49″ W. Lat.—14° 0′ 56″ N. Height above M.S.L.—10 feet.

Months.	Mean Pressure.		Temperature.							Mean Dew Point.		Relative Humidity.		Tension of Aqueous Vapour.		Rainfall.			
			Mean.	Means.		Absolute Max. and Min.										Total.	Maximum in one day.	Date.	No of days on which rain fell.
	7 a.m.	3 p.m.		Max.	Min.	Max.	Date.	Min.	Date.	7 a.m.	3 p.m.	7 a.m.	3 p.m.	7 a.m.	3 p.m.				
	Ins.	Ins.	°	°	°	°		°								Ins.	Ins.		
January	30·049	30·018	75·8	81·1	70·6	85·0	1st	66·5	3rd	68·1	69·9	84·2	76·5	·684	·733	14·12	3·16	9th	22
February	30·084	30·055	75·1	81·8	68·5	84·5	22nd	62·0	19th	68·1	68·7	87·1	71·5	·684	·708	2·66	·66	2nd	20
March	30·098	30·065	75·9	81·8	70·0	85·0	6th	65·0	20th	68 9	70·5	90·2	74·2	·733	·759	5·82	·83	25th	25
April	30·024	29·989	77·1	84·0	70·2	87·0	30th	66·0	16th	72·3	73·6	93·4	79·4	·785	·840	3·64	·68	22nd	23
May	30·023	29·984	82·1	87·0	72·2	89·5	19th	66·5	11th	72·2	72·4	84·6	65 2	·785	·785	3·24	63	29th	19
June	30·059	30·032	80·0	85 7	74·3	88·5	12th	71·5	8th	73·1	73·2	84·7	71·9	·812	·812	7·03	1·31	28th	27
July	30·068	30·047	80·5	86·5	74·6	89·0	6th	71·0	1st	72·7	76·4	84·7	74·5	·812	·897	5·01	·81	16th	17
August	30·033	30·008	79·8	85·4	74·2	89·0	3rd	71·0	16th	75·7	79·9	93·6	90 6	·897	1·023	15·65	4·18	25th	24
September	29 974	29·948	80·2	86 5	73·9	89·5	4th	71·0	23rd	75 1	78·5	90·6	84·9	·868	·990	7·72	·94	19th	23
October	29·988	29·953	79·0	85·0	73·1	88 0	1st	69·5	23rd	73·9	73 3	93·6	74·3	·840	·812	10·76	1·19	17th	31
November	29·969	29·932	78·0	84·3	71·8	88·0	10th	67·0	23rd	73·6	72·2	93·6	74·2	·840	·785	10·59	1·88	24th	21
December	30·006	29·972	75·8	83 1	68·6	89·0	3rd	63·0	29th	70·6	70·1	96·6	71·6	·759	·733	3·29	·87	7th	14
Year (Means ...	30·031	30·000	78·2	84·3	71·8	...	...	...	...	72·0	73·2	89·7	76·1	·791	·823	...	...	...	...
Year (Totals ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	89·53	...	...	266

Pressure readings corrected for Instrumental error, temperature and altitude.

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